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Perceptions of Fishermen Households on the Long-Term Impact of Coastal Resources Management in Panguil Bay

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Coastal resources management (CRM) has flourished as a management approach for attaining a more sustainable form of economic development in the coastal areas of the Philippines. This is reflected in the phenomenal growth of CRM and CRM-type activities over the past two decades or so (Pomeroy and Carlos 1996). The various CRM undertakings include a good number of largescale programs and projects that are implemented nationwide or with specific-area coverage, and financed significantly with public resources (FRMP 2001a).

The proliferation of CRM, coupled with the reasonably long time it has been in implementation, now calls for an evaluation of its long-term impact as a management and development approach. This is particularly true when a series of CRM activities have been conducted over many years in a specific coastal area and where some evidence of performance can be generated.

A cursory look at available literature shows that evaluation efforts on CRM were mostly at the program and project levels. Many of these were in the form of midterm reviews done halfway through activities (e.g., FRMP 2001b), annual reports (e.g., FRMP 2002), and terminal reviews conducted after the end of the project (e.g., PRIMEX and ANZDEC 1996a, 1996b). These works mainly assessed

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the performance of CRM activities vis-á-vis their short-term and/or medium-term objectives. Inhouse staff, commissioned evaluators and independent researchers usually conducted the analyses.

In this study, the long-term impact of CRM is evaluated not from the perspectives of technical people but based on the perception of its intended primary beneficiaries—the fishermen households. It does so not by looking into a specific CRM program or project but by observing the succession of CRM activities conducted in a single coastal area—Panguil Bay, Mindanao—cover many years. The objectives were to ascertain if CRM works, identify its major constraints if it does not, and recommend future courses of actions to address the constraints.

The study is important because how the long-term impact of CRM is perceived by fishermen households speaks a lot about the political acceptability of the approach in the coastal areas. It should be noted that there had already been studies that used household perceptions to assess CRM performance (e.g., Mulekom and Tria 1999; Katon et al. 1998; Katon et al. 1997; Pomeroy et al. 1997; Pomeroy and Carlos 1996). However, this study is different in that it does not delve on individual programs or projects, as did the other works, but on a series of CRM activities implemented in one coastal area over a reasonably long period.

This paper is organized as follows: The second section discusses the methodology while the third section presents the development of CRM in the Philippines. Background information on Panguil Bay is presented in the fourth section while the results and analysis are discussed in the fifth section. The sixth section discusses the various constraints to CRM implementation in Panguil Bay. Finally, the last two sections present the conclusions and recommendations.

METHODOLOGY

Scope

The survey on fishermen households covered selected coastal barangays in Panguil Bay. The barangays were chosen based on their having experienced continued CRM activities under both the Fisheries Sector Program (FSP) and the Fisheries Resource Management Project (FRMP) from the early 1990s up to the time of the study. The year of the survey was 2002.

Data sources

The study used three sources of data: published and unpublished literature on CRM, key informant interviews and the household survey. The first source included publications on CRM, and published and unpublished materials from the CRM projects in Panguil Bay. The second source consisted of interviews with key informants from the national and local governments, CRM projects, nongovern-

mental organizations (NGOs) and other groups involved in CRM activities in Panguil Bay. The third and the main source of data was the survey conducted among fishermen households in the bay.

Sample

The fishermen household survey had the fishermen household heads in selected barangays as respondents. Overall, there were 57 coastal barangays in three provinces located along Panguil Bay. Of these barangays, 11 (or about 20%) were selected based on considerations such as available resources, security in the barangay, familiarity of survey enumerators of the barangay, distance of the barangay from the study base, and the level of CRM activity in the barangay over the years.

To generate the sample of respondent fishermen households per barangay, a list of households were gathered from barangay officials and then identified for this study. The fishermen household respondents were then selected at random. In the actual survey, a formal and pre-tested questionnaire was the instrument applied by trained enumerators from the Mindanao State University-Naawan (MSU-N). The actual survey commenced in August 2002 and ended in December 2002.

The survey covered an estimated population of 2,165 fishermen households in all the barangays (Table 1). Of these, 20.42 percent were selected as survey respondents or sample. Of the fishermen household respondents of the survey, 51.13 percent were from Lanao del Norte, 27.15 percent were from Misamis Occidental and 21.72 percent were from Zamboanga del Sur.

Analytical method

The long-term impact of CRM may be analyzed using actual time-series or periodic data, and information that can compare CRM performance between periods of time. These data, however, are not consistently available for the FSP and FRMP, thus rendering an analysis of this type inapplicable.

To address the data problem mentioned above, the study employed the Baseline Independent Approach methodology that used fishermen household perceptions instead of actual data as basis for analyzing CRM performance over a substantial period of time (e.g., Pomeroy et al. 1996). The methodology has the advantage of proceeding without the benefit of actual data and yet still generating quantitatively-assessed evidence of CRM performance.

In the Baseline Independent Approach, the long-term impact of CRM is viewed in terms of its effects on: the impact indicators representing the overall well-being of both the human and nonhuman elements of the ecosystem; or the household well-being (Household) and well-being of the resource (Resource)

Table 1. Fishermen household population and number of survey respondents (by province, by municipality, by barangay, Panguil Bay) 2002

Province/ Municipality/ Barangay	Total Number of Fishermen Households	Number Of Survey Respondents	Percent to Total Survey Respondents	Percent to Total Fishermen Households
Lanao del Norte	948	226	51.13	23.84
Maigo	415	82	18.55	19.76
Sigapod	230	30	6.79	13.04
Balagatasa	146	31	7.01	21.23
Kulasihan	39	21	4.75	53.85
Kolambugan	305	96	21.72	31.48
Mukas	105	48	10.86	45.71
Tabigue	200	48	10.86	24.00
Kapatagan	228	48	10.86	21.05
Taguitic	228	48	10.86	21.05
Misamis Occidental	505	120	27.15	23.76
Bonifacio	106	48	10.86	45.28
Migpangi	106	48	10.86	45.28
Ozamis City	239	48	10.86	20.08
San Antonio	239	48	10.86	20.08
Clarin	160	24	5.43	15.00
Poblacion	160	24	5.43	15.00
Zamboanga del Sur	712	96	21.72	13.48
Aurora	530	48	10.86	9.06
Balas	530	48	10.86	9.06
Tambulig	182	48	10.86	26.37
Cabgan	182	48	10.86	26.37
Panguil Bay	2,165	442	100.00	20.42

Note: The number of fishermen households by barangay in Panguil Bay were either generated from barangay files or estimated by key barangay informants.

indicators (acronym are set in parenthesis). Following previous works (e.g., Mulekom and Tria 1999; Katon et al. 1998; Katon et al. 1997; Pomeroy et al. 1997; Pomeroy and Carlos 1996), other impact indicators such as the access of fishermen households to sources (Access), their control over the same resources (Control), their ability to participate in community affairs (Participate), their ability to influence community affairs (Influence), the prevalence of conflict in the community (Conflict), the compliance of the community with resource management (Compliance), and the amount of traditionally harvested resource in the water (Harvest) were also included in the analysis.

The fishermen households' perception on changes in the aforementioned impact indicators between before CRM (i.e., 10 years ago) and the present ("Today"), and between the present and future (10 years after the survey was conducted) was determined. The perceptions were gathered using a questionnaire whose questions employ a ladder diagram. The 10-point scale ascertains fishermen households' degree of satisfaction or dissatisfaction over certain propositions relating to the impact indicators. In the scale, "1" represents the lowest degree of satisfaction while "10" represents the highest. The study assumed that households have the ability to make dependable judgments on the change in the CRM indicators based on informed knowledge and experience on what is going on in their area. In addition to household perceptions, the survey gathered demographic and socioeconomic information to support the analysis.

DEVELOPMENT OF CRM IN THE PHILIPPINES

The CRM has many definitions and variants. In this study, CRM is used as a generic term that represents all FSP- and FRMP-related activities in Panguil Bay. Coastal resource management in general is defined as "a planning process that focuses on managing coastal resources in an integrative and systematic manner through an interdisciplinary research and decision-making process" (Hancock 1994). A government-produced literature called it "the participatory process of planning, implementing and monitoring sustainable use of coastal resources through collective action and sound decision-making" (DENR/DA-BFAR/DILG 2001a).

As a coastal management approach, CRM started in the United States in the 1970s (Hancock 1994). One of the earliest CRM-type activities in the Philippines was the 1974 reef conservation initiative undertaken by the Silliman University in the Apo Island and Sumilon Island in Western Visayas. Later on, the World Bank funded Central Visayas Regional Project I (CVRP I), which also utilized CRM approaches. Then, in 1986, the ASEAN/USAID/ICLARM Coastal Resource Management Program (CRMP) was pilot-tested in Lingayen Gulf, as was done in other pilot sites in Southeast Asia. Since then, CRM activities, both small- and largescale, have flourished in the country.

In general, CRM undertakings were implemented and funded by various institutions either working individually or in tandem, including foreign donor organizations, international loan-granting development institutions, national and local government agencies, NGOs, public and private universities and colleges, people's organizations and various types of cooperatives, and other public and private entities. Many of the largescale CRM projects were partly publicly funded.

No attempt was made to list all CRM activities in the Philippines ever since the management approach was first applied. Such an effort would have been

difficult to conduct due to a number of problems. For one, identifying fully the numerous coastal management-related activities over time and subsequently establishing those that are CRM by definition will be difficult. Moreover, many CRM activities are not only smallscale in nature but also conducted locally without any monitoring by agencies at the national level. This renders the identification of these CRM activities even more problematic.

The FRMP (2001a) made a listing of some of the recent major coastal resource management and related initiatives in the country, most of which had CRM-type components, excluding FSP (Table 2). There were 24 such undertakings conducted in different areas since 1993. Some ended during the second half of the last decade while others will terminate in the first half of the current decade. Some of the initiatives have regional coverage while others concentrated on specific provinces, communities or important areas such as islands, seas, bays, gulfs, sounds and marshlands.

Table 2. Recent major coastal resource management and related initiatives in the Philippines by duration and project sites

Initiative	Duration	Project Site
Fisheries Resource Management Project (FRMP)	1998-2003	Fisheries Sector Program Bays: Calauag Bay, Tayabas Bay, San Miguel Bay, Ragay Gulf, Lagonoy Gulf, Sarangani Bay, Carigara Bay, San Pedro Bay, Ormoc Bay, Sogod Bay, Panguil Bay FRMP Bays: Lingayen Gulf, Sapian Bay, Honda Bay, Puerto Princesa Bay, Butuan Bay, Gingoog Bay, Davao Gulf
Community-Based Resources Management (CBRM) Project	1998-2003	Regions: 5, 7, 8, and 13
Natural Resources Management Program (NRMP) – II, Coastal Resources Management Project	1996-2001	Regions 4, 7, and 11 Davao del Sur, Saranggani, Negros Occidental, Bohol, Cebu and Palawan
Natural Resources Management Program – Municipal Coastal Environment Initiative (NRMP-MCEI)	1998-2002	Cebu, Negros Oriental, Bohol, Davao del Sur, Sarangani, South Cotabato, Batangas, Palawan, Tawi-Tawi (CRM Expansion Areas)
National Integrated Protected Areas Programme (NIPAP)	1995-2000	(only those related to fisheries are entered) El Nido Marine Reserved, Coron Island, Palawan; Malampaya Sound, Palawan; Sibuyan Island, Romblon
The Prevention and Management of Marine Pollution In East Asian Seas	1994-1998	Batangas Bay

Table 2 continued

Initiative	Duration	Project Site
GEF/UNDP/IMO* Regional Programme on Partnerships In Environmental Management for the Seas of East Asia (PEMSEA): Demonstration Sites in the Philippines. A. Regional Integrated coastal Management (ICM) Demonstration Site	1995-2004	Batangas Bay
GEF/UNDP/IMO Regional Programme on Partnerships In Environmental Management for the Seas of East Asia (PEMSEA): demonstration sites in the Philippines. B. Pollution hot spots demonstration Site	1999-2004	Manila Bay
GEP/UNDO/ IMO Regional Programme on Partnerships In Environmental Management for Aurora Integrated Area development Project (AIADP) Phase II. Watershed and Coastal Resources Protection and Management Component	1995-2000	Nine (9) Watersheds: Amro, Talaytay, Dipaculao, Bazal, San Luis, Diablo-Ingit-Zabali-Malayat, Dingalan, Pinamacan, Calabgan in Aurora Province
Coastal Environmental Program (CEP)	1993-onwards	Regions 1 to 12, NCR, CARAGA
Natural Resources Management Program – Industrial Initiatives for Sustainable Environment (NRMP-IISE)	1998-2002	Cebu, Negros Oriental, Bohol, Davao del Sur, Sarangani, South Cotabato, Batangas, Palawan, Tawi-Tawi (CRM Expansion Areas)
Southern Mindanao Integrated Coastal Zone Management Project	1999-2005	DENR Municipalty of Malalag, Davao del Sur
Coastal Environmental Information System (CEIS)-Eastern Visayas	1999-2002	Eastern Visayas; Northern Samar, Western Samar, Eastern Samar, Biliran, Leyte and Southern Leyte
Integrated Visayan Sea Coastal Resources and Fisheries Management Program (VisSea)	1999-2004	Coastal Communities along the Visayan Sea; for the province of Iloilo: Carles, Balasan, Estancia, Batad, San Dionisio, Concepcion, and Ajuy; For Negros Occidental: Cadiz City and Escalante: for Cebu: Bantayan, Santa Fe, Madridejos, Medillin, and Daanbantayan; and for Masbate: Balud, Milagros, Cawayan, Placer, and Esperanza
Integrated Coastal Zone Development-Silago	2000-2009	Coastal Municipalities of Anahawan, Hinunagan, Hinundayan, Silago (Southern Leyte Province)
Community-Based Coastal Resource Management-Eastern Samar	2000-2003	Eastern Samar

* GEF/UNDP/IMO – Global Environment Facility/United Nations Development Program/ International Maritime Organization

Table 2 continued

Initiative	Duration	Project Site
Fisheries Management and Conservation project the Sulu Sulawesi	1999-2002	Sulu and Sulawesi Seas (Philippines, for Indonesia, and Malaysia)
Submarine Geology and Mineral Resources Off the of Surigao del Norte of the Philippines	1998-2000	Nearshore and Offshore Areas of Coast Surigao del Norte, Mindanao, Philippines
Marine and Coastal Erotion / Degration and Geohazard Studies	1998-2000	Nationwide
Establishment of National Geological Monuments Hundred Islands, Pangasinan	1998-2000	Region 1- Ilocos Norte Sand Dunes and
Visayas Coastal Resources Management Initiatives Negros Oriental, Aklan	1992-2002	Eastern Samar, Bohol, Cebu (Province),

Source: FRMP 2001a

From the legal aspect, two important laws that devolved significant powers from the national to the local governments hastened the development and implementation of CRM (DENR/BFAR-DA/DILG 2001a, 2001b; Elazegui et al. 1999; PIAF 1998; LGC 1996). The first is the Local Government Code (LGC) or Republic Act (RA) 7160, which was passed by the Congress of the Philippines in 1991 to decentralize governance in the country. This law has several features that provided the legal basis for local management and, in effect, for the expansion of CRM. Among the important provisions is Section 149, which provided the municipal governments the exclusive right to grant fishery privileges and impose rental fees and charges in the use of municipal waters without permission from the national government.

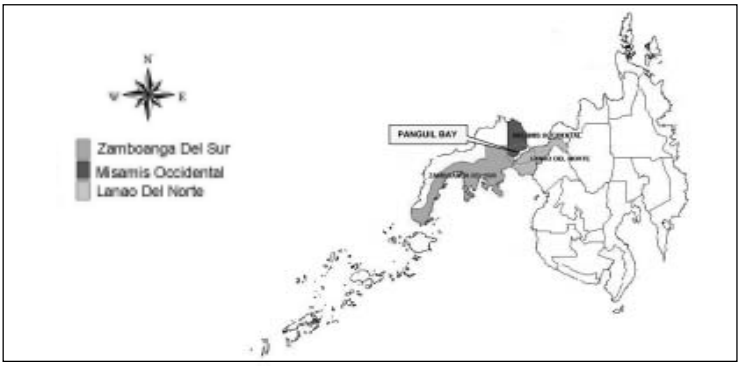
The other national law of great significance to the development of CRM is the Philippine Fisheries Code or RA 8550. This law was enacted in 1998 to codify all laws then existing and implement new concepts for fisheries management. It has various provisions that explicitly defined the role of the local governments in the management of coastal resources in various aspects such as jurisdiction, enforcement, legislation, protection/conservation, regulation, and coordination and consultation. Among others, the Fisheries Code reaffirms the jurisdiction of the municipal and city governments over municipal waters and the scope of municipal waters earlier defined in the LGC. Another important feature of the Code with direct bearing on CRM is its recognition of the importance of active participation of the local fishermen, other stakeholders and the coastal communities in management.

BACKGROUND OF PANGUIL BAY

The bay, its fisheries resources and management problems

Panguil Bay is bordered by the provinces of Lanao del Norte in the east and Zamboanga del Sur and Misamis Occidental in the west (Figure 1). It is shaped like a canine tooth from where it derives its name. The Bay has a water area of 18,000 hectares (MSUNFSTDI 1996; MSU-A 1991). Its total catchment area of 309,738 hectares is traversed by rivers and creeks that originate from two mountain ranges.

Figure 1. Map of Mindanao showing the provinces bordering Panguil Bay



Fishing is an important source of livelihood among the residents living in the coastal barangays of Panguil Bay. In general, fishing in the bay is artisanal and subsistence in nature. In 1980, a total of about 4,000 persons comprised the fishing population in the coastal barangays, either as part time or full time fishermen (Adan 2000). This number of fishermen increased to an estimated 7,036 fishermen in 1990 and 9,847 in 1995.

Panguil Bay is home to various fish and seafood species. Among the most important are penaied shrimps and prawns, gobies, anchovies, mullets, pony fishes, blue crabs, therapons, carangids, lantern fishes, and hairtails (De Guzman et al. 1996). However, although fish and seafood were abundant, a reduction in the species has been observed over the years. In particular, in 1983, a total of 201 species falling under 86 families and 19 orders of finfishes, crustaceans and mollusks were identified in the area (Adan 2000). This number went down to only 145 and 121 species in 1991 and 1996, respectively.

In addition to the decreasing stock composition, interacting socioeconomic, environmental, institutional and political pressures related to fishing have negatively affected Panguil Bay. These include worsening environmental degradation, deepening poverty among coastal fishermen, and overall poor and ineffective CRM. It was against this backdrop that the national government implemented various CRM activities in the area.

The fisheries sector program

The FSP was implemented in the country between 1990 and 1994, a largescale development effort financed through loan assistance from the Asian Development Bank (ADB) and the Overseas Economic Cooperation Fund (OECF) of Japan. The program aimed to attain sustainable fisheries management through a package of policy and institutional reforms and strategic interventions so as to rationalize the use of fisheries resources (PRIMEX AND ANZDEC 1996b; ADB 1989). One of its six components was a community-based CRM designed to promote resource enhancement and income diversification. Its implementation covered 12 priority bodies of water in the country: Manila Bay, Calauag Bay, San Miguel Bay, Tayabas Bay, Ragay Gulf, Lagonoy Gulf, Sorsogon Bay, Carigara Bay, San Pedro Bay, Ormoc Bay, Sogod Bay and Panguil Bay.

As a management approach, CRM was formally introduced in Panguil Bay with the implementation of FSP. The bay was included in the critical list because of the observed environmental degradation, resource depletion, social conflicts and institutional dysfunction in the area. Thus, the FSP initiated four major categories of CRM interventions in Panguil Bay namely: habitat rehabilitation; livelihood assistance; law enforcement; and capability building.

A major habitat rehabilitation activity under the FSP was mangrove reforestation. Although the exact mangrove size reforested under the FSP is not known, the total mangrove reforested area in the province during the period when FSP was under implementation (1993 to 1995) reached about 495 hectares (MSUNFSTDI 1996). Of these, 11 hectares were in Misamis Occidental, 44 hectares were in Zamboanga del Sur, and 440 hectares were in Lanao del Norte. The most successful of these mangrove reforestation efforts was reported in Mukas, Kolambugan.

Another habitat rehabilitation project in Panguil Bay under the FSP was the establishment of artificial reefs (ARs). Long before the program was established, ARs were first deployed in the bay areas in Gango, San Antonio, Ozamiz City by the Department of Agriculture in collaboration with the local government and fishermen. Eventually, a total of 336 ARs were installed between 1988 and 1990 in the waters of Ozamiz, Tangub and Clarin in Misamis Occidental, and in Maigo and Pigcarangan,Tubod in Lanao del Norte. It was reported that FSP established its own ARs at the rate of one module per barangay in Panguil Bay as well as in other priority bays all over the country (PRIMEX and ANZDEC 1996).

The FSP also implemented a livelihood assistance program in Panguil Bay. Two NGOs—the Network Foundation Inc. (NFI) and the *Tinabangay sa Panguma Alayon sa Industriya* (TIPASI) Foundation, Inc.—were contracted for the program. These NGOs organized the community in the bay area to provide livelihood assistance as well as set up the basic organizational structure for CRM. Along with the local offices of the DA and the local government agencies (LGUs), the

NGOs eventually established a total of 89 cooperatives that managed a variety of livelihood assistance projects in the area.

To further promote livelihood programs in Panguil Bay, the Bureau of Forestry and Aquatic Resources (BFAR) established two pilot mariculture projects in 1990 under the FSP: The Silanga Mariculture Farm in Tangub City, where green mussels from Cavite were cultured and bred; and the Malaubang Fish and Seaweed Farm in Ozamiz City. The pilot projects served to demonstrate the feasibility of culturing selected plants and fish species in marine waters and were expected to draw adherents from the fishing population.

Law enforcement was another major program in Panguil Bay. In a large measure, the FSP helped organize, train and deputize law enforcement units in the area. Furthermore, it provided patrol boats, communication paraphernalia and other equipment to make law enforcement more effective. In the 1990s, law enforcement in Panguil Bay involved the DA, local government units and the Panguil Bay Development Council (PBDC).

Capacity-building was another important component of the FSP in Panguil Bay. This was because the lack of skilled personnel in BFAR and the LGUs in the area was a major impediment to successful capacity-building measures. Thus in 1996, the Regional Composite Team (RCT) Training Program was conducted for the technical staff of the Department of Agriculture-BFAR and the municipal agricultural officers (MAOs) of LGUs. The training included lectures, workshops and hands-on exercises on how to assess ecological habitats, fish stocks, water quality, demography and socioeconomics.

Fisheries resource management project (FRMP)

The FRMP aimed to continue and build on the gains of the FSP. It was implemented in the country from 1998 to 2003 under the DA and with funding assistance from the ADB and Japan Bank for International Cooperation (JBIC). Its objectives were: (1) to promote conservation and sustainable management of the coastal fisheries resources by reversing the trend of fisheries resource depletion in municipal fisheries and (2) to reduce the extensive poverty of fisherfolk in coastal areas by promoting income diversification that will reduce the reliance of coastal communities on fishing, and increase their incomes and living standards (FRMP 2002, 1999). The three important components of the FRMP are fisheries resource management, income diversification and capacity building. Aside from the original 12 bodies of water covered by the FSP, the FRMP includes seven more coastal areas: Honda Bay, Puerto Princesa Bay, Davao Gulf, Lingayen Gulf, Gingoog Bay, Butuan Bay and Sapian Bay.

In Panguil Bay, the FRMP operations covered three municipalities in Lanao del Norte: Maigo, Kolambugan and Kapatagan; the cities of Tangub and

Ozamis and the municipality of Bonifacio in Misamis Occidental; and the municipalities of Aurora and Tambulig in Zamboanga del Sur. The progress report (FRMP 2002) and the Mid-Term Report (FRMP 2001) document the status and details of the program. These documents, however, concentrate on the FRMP as a whole and provide only sketchy description of the activities done in Panguil Bay in particular. As of December 2000, the project established and maintained 30 hectares of fish sanctuaries in Clarin and Ozamis City and 20 hectares in Tangub City. The FRMP has also reforested/rehabilitated/established/maintained about three hectares of mangrove trees in Maigo. Individual reports from the field indicated some progress in fisheries law enforcement under FRMP. In Kapatagan, the Fishery Law Enforcement Team (FLET) was established, and trained, and was equipped and able to demolish illegal fishing structures, confiscate illegal paraphernalia and equipment, and even catch fishermen-violators. In the Misamis Occidental part of Panguil Bay, the FRMP facilitated the drafting, approval and enactment of local fisheries codes; creation of the local fisheries law enforcement teams under its jurisdiction; and the training of the FLET members. The BFAR also helped reactivate the City Fisheries and Aquatic Resources Management Councils (CFARMCs) and the Barangay Fisheries and Aquatic Resources Management Councils (BFARMCs) in the region, and provided the LGUs with information education and communication (IEC) materials.

RESULTS AND ANALYSIS

Demographic characteristics

Of the 442 households surveyed in Panguil Bay, 373 (84.39%) were Catholic while 67 (15.16%) were non-Catholic (Table 3). Most of the households were Cebuanos by ethnic origin (72.85%) while the rest belonged to other ethnic groups. The households' average number of years in the barangay was 30 years. Of the households, 259 (58.6%) were natives of the barangay while only 177 (40.05%) were migrants. An average household consisted of five persons. The average age of the household heads was 39 years. Around 309 (69.91%) were elementary graduates or had education levels below that, while 115 (26.02%) were in the high school level and 18 (4.07%) were in the post secondary level. Around 95 percent had no plans to migrate elsewhere.

Fishing-related characteristics

Fishermen households had engaged in fishing for an average of 30 years (Table 4). Around 62% (or 271 fishermen) fished on a seasonal basis. If given the chance to choose, 351 (79.41%) fishermen household-respondents would prefer to be fishermen again. Among the household heads, only 72 (16.29%) said that they

Table 3. Selected demographic characteristics of fishermen household respondents, Panguil

Variable	Number	Frequency	Percent
1. Religion			
Catholic		373	84.39
Non-Catholic		67	15.16
No Response		2	0.45
Total		442	100
2. Ethnicity			
Cebuano		322	72.85
Others		115	26.02
No Response		5	1.13
Total		442	100.00
3. Average years in the barangay	30	442	100.00
4. Origin			
Native		259	58.60
Migrant		177	40.05
No Response		6	1.36
Total		442	100.00
5. Average household size	5	442	100.00
6. Average age of respondents	39	442	100.00
7. Highest educational attainment of respondents			
Elementary & Below		309	69.91
High School		115	26.02
Post Secondary		18	4.07
Total		442	100.00
8. Plan to migrate?			
Yes		8	1.81
No		417	94.34
No Response		17	3.85
Total		442	100.00

Source: Survey of Fishermen Households

received support from the government in their fishing activity while 358 (81%) mentioned that they did not.

FSP/FRMP-related characteristics

Majority (68.10%) of the households were aware of the FSP/FRMP in their area while 293 (66.29%) said they were also aware of the objectives of the projects (Table 5). Also, 325 (73.53%) reported that they were not employed in these projects and 321 (72.62%) did not have relatives who were directly employed in the projects. However, 211 (47.74%) also mentioned that they gained certain benefits from the projects other than financial gain.

Of the household heads, only 93 (21.04%) said that they had attended training sessions under the FRMP/FSP projects and only 19 (4.3%) mentioned that

other members of their household had attended these trainings. Of the household heads, only 42 (9.50%) mentioned that they had attended CRM-oriented trainings in the past 10 years.

Table 4. Selected fishing-related characteristics of fishermen household respondents, Panguil Bay

Variable	Number	Frequency	Percent
1. Average number of years fishing	30	442	100.00
2. Is fishing seasonal?			
Yes		271	61.31
No		171	38.69
Total		442	100.00
3. Would like to be a fisherman again?			
Yes		351	79.41
No		91	20.59
Total		442	100.00
4. Received any support from government in fishing activity?			
Yes		72	16.29
No		358	81.00
No Response		12	2.71
Total		442	100.00

Source: Survey of Fishermen Households

Table 5. Selected FSP/FRMP-related characteristics of fishermen household respondents, Panguil Bay

Variable	Frequency	Percent
1. Awareness on any FSP/FRMP projects in the area?		
Yes	301	68.10
No	90	20.36
No Response	51	11.54
Total	442	100.00
2. Awareness of FSP/FRMP project objectives?		
Yes	293	66.29
No	101	22.85
No Response	48	10.86
Total	442	100.00
3. Employed in the project?		
Yes	71	16.06
No	325	73.53
No Response	46	10.41
Total	442	100.00
4. Relatives directly employed in the project?		
Yes	57	12.90
No	321	72.62
No Response	64	14.48
Total	442	100.00

Table 5 continued

Variable	Frequency	Percent
5. Benefit from the project other than financial gain?		
Yes	211	47.74
No	184	41.63
No Response	47	10.63
Total	442	100.00
6. Attended training sessions?		
Yes	93	21.04
No	299	67.65
No Response	50	11.31
Total	442	100.00
7. Other member of household attended training sessions?		
Yes	19	4.30
No	373	84.39
No Response	50	11.31
Total	442	100.00
8. Attended CRM-Oriented trainings in past 10 yrs?		
Yes	42	9.50
No	353	79.86
No Response	47	10.63

Source: Survey of Fishermen Households

Statistical results

The perceptions of households on the impact indicators were then analyzed. Based on the perception data gathered through the survey employing the ladder diagram, the mean ranks of the impact indicators for "Today," "Before" (10 years ago), and "After" (10 years hence) were computed, and the difference between the mean ranks of these three time periods were measured. Then, an approximate Z-value for the Wilcoxon Signed Rank Test was computed to test if the observed difference in the mean ranks is statistically significant. The analyses presented below were for the entire Panguil Bay.

For the Today and Before time periods, a significant difference was found to exist between the mean ranks of the indicators Household, Resource, Income, Access, Conflict and Harvest (Table 6). Furthermore, the signs of the difference were negative, which implied that the fishermen households in Panguil Bay perceived their household well-being, resource well-being, local income, access to resources, community conflict and harvest to have deteriorated over the last 10 years. On the other hand, there was also a significant difference between the mean ranks of the indicators Control and Compliance. The signs of the difference were positive, which meant that the households perceived control over resources and community compliance to have improved in the last 10 years.

Table 6. Perceived changes in indicators from "before" state to "today" state, Panguil Bay (n = 442 households)

Indicators	Today	Before (10 years ago)	Today-Before	Approximate Z - value **	P value
Household	5.69	6.61	-0.91	-13.18	0.000*
Resource	5.94	7.65	-1.71	-17.23	0.000*
Income	5.57	6.57	-0.99	-13.48	0.000*
Access	5.77	6.97	-1.19	-14.73	0.000*
Control	5.75	4.82	0.93	12.01	0.000*
Participate	5.49	5.50	-0.01	-0.40	0.692
Influence	5.33	5.32	0.00	-0.20	0.843
Conflict	5.68	5.78	-0.10	-3.11	0.002*
Compliance	6.10	5.07	1.03	14.31	0.000*
Harvest	5.89	7.77	-1.88	-17.10	0.000*

Note: * - significant at 5%
** - Approximate z value of Wilcoxon sign rank test

On the other hand, the comparison of the After and Today periods showed significant difference between the mean ranks of the indicators Household, Resource, Income, Access and Harvest (Table 7). The signs were negative, which suggested that households in Panguil Bay perceived household well-being, resource well-being, household income, access to resources and harvest would also decrease in the next 10 years. In contrast, there was a significant positive difference between the mean ranks of the indicators Control and Compliance. This suggested that households believed control over resources and community compliance would improve in the next 10 years.

To bring the analysis to a deeper level, CRM beneficiary households were disaggregated from the total respondent households of the survey. These were households whose heads were directly employed by the FSP and/or FRMP, received benefits other than financial gains from the projects, and/or attended trainings from the projects. Furthermore, beneficiary households also included those whose relatives were directly employed or trained by the projects. Again, the statistical analysis done for all households was applied for the CRM beneficiary households. Of those covered by the survey, 259 (58.60%) were beneficiary households.

The Today and Before comparison involving Panguil Bay CRM beneficiary households showed significant difference existed between the means of the indicators Household, Resource, Income, Access, Conflict, and Harvest (Table 8). The signs of the difference were negative, which implied that the fishermen households in Panguil Bay perceived household well-being, resource well-being, local income, access to resources, community conflict and harvest to have deterio-

Table 7. Perceived changes in indicators from "today" state to "after" state, Panguil Bay (n = 442 households)

Indicators	After (10 years hence)	Today	After-Today	Approximate Z value	P value
Household	5.38	5.69	-0.31	-8.56	0.000*
Resource	5.20	5.94	-0.74	-13.12	0.000*
Income	5.26	5.57	-0.31	-8.18	0.000*
Access	5.30	5.77	-0.47	-10.68	0.000*
Control	6.45	5.75	0.70	13.04	0.000*
Participate	5.53	5.49	0.04	1.66	0.096
Influence	5.33	5.33	0.01	0.93	0.352
Conflict	5.70	5.68	0.02	-0.50	0.614
Compliance	6.63	6.10	0.53	12.07	0.000*
Harvest	4.87	5.89	-1.02	-14.50	0.000*

Note: * - significant at 5%
** - Approximate z value of Wilcoxon sign rank test

rated in the last 10 years. On the other hand, there was significant positive difference between the means of the indicators Control and Compliance. That is, the households perceived control over resources, and community compliance had improved in the last 10 years.

Table 8. Perceived changes in indicators from "before" state to "today" state, CRM beneficiaries, Panguil Bay (n = 259 households)

Indicators	Today	Before (10 years ago)	Today-Before	Approximate Z - value **	P value
Household	5.97	6.86	-0.90	-9.51	0.000*
Resource	6.21	8.04	-1.83	-13.15	0.000*
Income	5.83	6.81	-0.98	-9.98	0.000*
Access	6.03	7.45	-1.41	-12.22	0.000*
Control	5.93	5.09	0.84	8.25	0.000*
Participate	5.75	5.73	0.02	0.20	0.842
Influence	5.54	5.50	0.04	0.36	0.718
Conflict	5.97	6.11	-0.14	-1.98	0.047*
Compliance	6.35	5.34	1.01	10.74	0.000*
Harvest	6.20	8.24	-2.05	-12.98	0.000*

Note: * - significant at 5%
** - Approximate z value of Wilcoxon sign rank test

For the After and Today comparison, there were significant negative differences between the means of the indicators Household, Resource, Income, Access and Harvest (Table 9). The negative signs suggested that the CRM beneficiary households in Panguil Bay perceived that household well-being,

Table 9. Perceived changes in indicators from "today" state to "after" state, CRM beneficiaries, Panguil Bay (n = 259 households)

Indicators	After (10 years hence)	Today	After-Today	Approximate Z value	P value
Household	5.64	5.97	-0.32	-6.49	0.000*
Resource	5.41	6.21	-0.80	-9.98	0.000*
Income	5.50	5.83	-0.33	-6.08	0.000*
Access	5.46	6.03	-0.57	-8.42	0.000*
Control	6.67	5.93	0.74	10.09	0.000*
Participate	5.81	5.75	0.07	2.32	0.021*
Influence	5.54	5.54	0.00	0.69	0.492
Conflict	6.04	5.97	0.07	0.81	0.416
Compliance	6.90	6.35	0.56	9.40	0.000*
Harvest	5.00	6.20	-1.20	-11.57	0.000*

Note: * - significant at 5%
** - Approximate z value of Wilcoxon sign rank test

resource well-being, household income, access to resources and harvest would decrease in the next 10 years. Only the differences between the means of the indicators Control, Participate and Compliance were significantly positive. This meant that households believed control over resources, participation in community affairs, and community compliance would improve in the next 10 years.

Analysis of results

Most fishermen households in Panguil Bay were Catholic and Cebuano, had lived in their barangays for an average of 30 years and consisted of five members. The household heads were on average 39 years old, and had been fishing for an average of 30 years. Most had elementary education, had no plans to migrate, been fishing on a seasonal basis, and would prefer to be fishermen again. Most received little support from the government but many were also aware of CRM activities, particularly the FSP and FRMP, in their area and the objectives of said activities. Only a few of the households were directly employed in CRM projects or had relatives who were employed but many benefited from the projects other than in the form of financial gain. Furthermore, only a few received CRM training or had other members in their households who attended trainings.

Based on the above data, some important observations need. In particular, most fishermen households in Panguil Bay belonged to one faith and one ethnic tribe, had a family size about the same as the national average (NSO 2001) and had lived in their respective barangays for a long time. The fishermen themselves were relatively young; had been fishing for a long time and were likely to start doing so

at an early age; were undereducated, doing fishing on a seasonal basis and dedicated to fishing as a form of livelihood.

The homogeneity of fishermen households in both faith and tongue is, to a significant extent, favorable for CRM. This trait should help reduce social frictions. Households' longevity in the same barangay and their lack of plans to migrate should also be an advantage because of the permanence or continuity of residence of the people targeted by the CRM activities. Being young and dedicated are also positive traits among the fishermen since these provide their vigor and interest in the long-term development of the resources they depend on. Even the fishermen's undereducation should be taken as positive as it provides areas for improvement under CRM. That they are educated at the elementary level means they can read and can write materials CRM.

Statistical data show some interesting results as well. On the negative side, regardless of whether they were CRM beneficiaries or not, fishermen households in Panguil Bay perceived their fish harvest, income and overall well-being to have deteriorated in the last 10 years, when CRM was implemented, and would continue to do so in the next 10 years. They believed that the well-being of the coastal resources they depend on decreased as well and would continue to decline in the future. Furthermore, results indicate that other impact indicators had also worsened and would continue to do so.

On the positive side, however, fishermen households consistently asserted that two institutionally related impact indicators—-their control over resources and community compliance to rules and regulations—had improved in the last 10 years of CRM and would continue improving in the future. These results speak well of the potential of CRM to effect the institutional changes, particularly the legal, and the monitoring and enforcement components.

CONSTRAINTS TO CRM

Some of the most important constraints to the implementation of CRM in Panguil Bay over the last 10 years or so are discussed below. The issues are based on information generated from national and local key informants and are not ordered in terms of importance.

Changing government priorities

At both the national and regional levels, the appointive officials of various government agencies involved in CRM implementation had come and gone many times over the last 10 years and the priorities related to CRM had changed as well. A shift in public officials' priorities away from CRM means the diminution of its importance in the overall programs of government.

Isolated CRM implementation

Another important constraint to CRM is the failure of integrated bay management to take root in the past 10 years, due mainly to the isolated approach with which CRM has been implemented. This, in turn, was due significantly to political subdivisions' dominance in the country and the turf-driven mentality among local government officials.

Discontinuity of CRM activities

The CRM implementation has been intermittent over time. Between FSP and FRMP, this inconsistency in implementation was brought about by a couple of reasons. First, the two projects were taken as separate from each other when they were first planned and implemented. Second, the time gap of a few years between the end of FSP and the start of FRMP created a vacuum in the implementation of CRM activities in the bay.

Sub-optimal utilization of research

The low utilization level of research results on both the FSP and FRMP is another problem. Most CRM research documents remain stacked somewhere in government archives. There is not much initiative on the part of the CRM implementers, researchers and consultants to present the results of research to the public. Had it been shared, the practical value of research to fishermen and other stakeholders would have greatly increased.

High and unmet expectations

The high program expectations FSP conveyed to the fishermen of Panguil Bay, especially pertaining to alternative livelihood assistance, may have worked against the effectiveness of the program, and of FRMP, later. For many fishermen, the livelihood assistance did not materialize, leading to their disillusionment over the CRM programs. This led them to think of CRM as yet another government program that provides lip service, some hope and not much else.

Politicized implementation

The FSP's image as a politically influenced program in Panguil Bay may have negatively affected the FSP itself and later, the FRMP. The FSP implementers were perceived by many stakeholders as at times politically influenced in their decisions, particularly in the selection of sites for mangrove reforestation and other activities. This perception of FSP has been inherited by FRMP by virtue of its being a similar government program.

Disharmony among LGUs

The comparatively lower overall budget of the FRMP when compared to FSP, and the FSP's relative decrease in geographical scope and activities have created important implementation problem. Some local government officials have been unhappy over the exclusion of their areas from the FRMP coverage while others have been complaining about the sporadic and low level of activities in their sites.

Untimely fund releases

An often-mentioned problem in CRM implementation in the Panguil Bay is the delay and untimely releases of project funds. Some consider this the single most constraining factor in CRM implementation. The delay in project funds upsets the timing of project activities, reduces their effectiveness, opens to question the credibility of implementers, reduces the interest of various partners and beneficiaries, and threatens the entire rationale of CRM.

Fund underutilization

Fund underutilization is another problem in CRM implementation that is partly caused by the delay in the approval of contracts between the project proponents and those hired to conduct specific activities. Fund underutilization is particularly critical when a CRM is nearing its end. With substantial funds still at hand and limited available time, there is hastiness in the selection and conduct of activities.

Nonexistent critical mass of CRM workers

After 10 years or so of implementation, CRM is yet to attain the critical number of staff and workers. Many staff members who worked for FSP had moved on and were not involved with FRMP. Similarly, some FRMP staff members who worked for the project in the early stages have already moved on to other areas of work outside of CRM. This exodus is mainly caused by the low level of incentives offered by CRM projects to their staff, particularly to those government employees seconded only from the national and local government units.

Too much training

Many local stakeholders in Panguil Bay think that the CRM proponents conducted too much training without the necessary follow-up in terms of production-oriented and livelihood promotion activities. Its image as a mainly training-oriented program does not quite speak well of CRM as a whole.

Too broad coverage

Lastly, CRM in general, and FSP and FRMP in particular, have been too broadly implemented all over the country. This approach stretches the limits of the finan-

cial, manpower and other existing resources of the CRM beyond what it can afford to do. It also results in haphazard implementation of activities in terms of scope and coverages just to meet requirements.

CONCLUSIONS

The study looked into the household perceptions on the long-term impact of CRM using Panguil Bay as case study. It generated the following findings and conclusions about the fishermen and fishermen households in the bay:

- Fishermen households' homogeneity in faith and ethnic origin is perceived as favorable for CRM, particularly in facilitating collaboration and work organization;
- The fact that fishermen households had lived in their barangays for a long time and had no plans to migrate are advantages to CRM because of the continuity in tenure of the people targeted by activities;
- Fishermen's youth and dedication are positive traits since these make them physically capable for and psychologically committed to the long-term development of their livelihood and the resources such livelihood depends on;
- Although fishermen were mostly literate, they are undereducated. They should be considered as challenges and areas for improvement under the CRM;
- Fishermen in general have many positive attitudes and values, including a sense of responsibility over the coastal resources they exploit, which also should augur well for the implementation of CRM.

Despite the above positive factors going in favor of CRM in Panguil Bay, the study generated the following findings in terms of the long-term impact of the implementation of the management approach in the bay:

- In general, regardless of whether they were CRM beneficiaries or not, fishermen perceived that their harvest, income and overall well-being had deteriorated in the last 10 years and would continue to be so in the next 10 years; and
- Fishermen believed that the well-being of the coastal resources on which they depend on had decreased in the last 10 years and would continue to decline in the future;
- Fishermen thought that their control over resources and community compliance to rules and regulations had improved in the last 10 years and would continue to improve in the future.

Caveats must be cited regarding the abovementioned conclusions. First, the perceptions of fishermen households about the changes in the impact indicators over time could be unintentionally biased (e.g., due to the limited or wrong information on which they are based on), or intentionally biased (e.g., to heap praise or scorn on CRM as a management concept and/or on its practitioners [see e.g., Pomeroy et al. 1996]). Second, impact indicators in Panguil Bay are certainly not only determined by CRM but by various other development factors as well. In general, the economic, social and environmental changes as well as progress or retrogress within and outside Panguil Bay can significantly influence in either direction the actual impact changes over time and the people's perceptions about them.

Assuming that the perceptions of the fishermen households are reasonably unbiased and the other development factors influencing changes in the impact indicators are neutral, the results indicate that although it had some positive contributions, CRM in Panguil Bay in general failed to attain its long-term objectives of improving the well-being of the fishermen households and the resources they depend on.

RECOMMENDATIONS

Given the above conclusions, the problems faced by CRM in Panguil Bay have to be addressed if the program's long-term performance is to be reversed through yet another CRM project in the future. Following are the recommended actions for the constraints cited in this paper:

- On the issue of changing priorities and support by the government, a coordinated effort to inform government officials on CRM will increase chances of support. It will also help if CRM implementers be politically neutral and desist from seemingly supporting the agenda of certain politicians.

  The failure of the integrated management approach to take root in Panguil Bay is partly a factor of time since 10 or so years pale in comparison to the decades of experience under the current political subdivision approach. In a way, CRM as it is practiced has contributed to the fragmented approach of management, where the emphasis is on certain municipalities and barangays. Future CRM projects in Panguil Bay should move toward a more holistic approach, where the whole bay is given precedence over only some of its parts.

  Long-term and integrated planning for a series of CRM projects and not just individual projects taken in isolation will help avoid the problem of discontinuity between projects. Other things

the same, projects should be consistent with one another particularly in terms of overall objectives.

- Research has a key role in CRM and should remain so in succeeding efforts. However, for CRM, academic and upstream research will have less relevance compared to downstream and action-oriented research. Therefore, the latter kind of research must be supported over the other. Researchers in CRM must be more action-oriented than academic-oriented by involving themselves in the dissemination and advocacy side of research. They must be accorded adequate resources so that they can conduct research that is way beyond the call of duty.
- Having stakeholders disheartened by unfulfilled promises related to CRM are unavoidable when a process takes a long time to produce tangible results. What is important is that the approach of promising too much and delivering too little is accepted as a fault in CRM implementation. Then, implementers can move on by making stakeholders understand that CRM is less about attaining short-term gains and more about achieving long-term objectives.
- The politics involved in implementing CRM is a problem that is difficult to address. As earlier mentioned, it is important that how CRM implementers relate to local politicians does not affect the conduct of the research activities—a stance that is better said than done. It will also help if CRM implementers can come up with a system that penalizes politically conniving staff.
- When funds are tight and prioritization in terms of covered areas is needed, the initial conflicts that arise may be minimized by properly explaining to the specific local governments why and how prioritization was made. Criteria for prioritization must be set clearly and agreed upon by contending parties.

  The delay in fund releases due to bureaucratic inertia is prevalent in the public sector. The problem within the budgetary process has to be solved. The CRM implementers will just have to be resourceful in speeding up the budgetary procedures within the bounds of the law and come up with an internal system that will accelerate the approval of contracts and related documents.
- As an offshoot of fund delays, fund underutilization would have to be solved as well. It will be ill advised to pressure existing CRM projects and activities to speed up its spending on funds simply to meet utilization requirements of donors. The solution is not to speed up the spending but rather, to hasten the selection of activities that can be justifiably funded.

- Building a roster of CRM workers requires both investments in their training and education and provision of incentives to make them stay on. Incentives such as further education and career development will also help bright and environmentally-oriented college graduates to think about CRM work as a career option.
- The notion that CRM has given too much emphasis on training is a negative perception and therefore, has to be corrected. As an approach for solving problems in the coastal areas, CRM should focus less on theory and more on actual results. A closer look should be done to see if training is done properly or just conducted to make up for deficiencies in other work areas.
- Lastly, there may be a need in the future to reduce the coverage of CRM and concentrate only on specific high priority areas and high priority problems. The ambitious approach to have CRM as a solution to most, if not all, problems on coastal resources may not work given the limitation of technical, manpower and financial resources that the country is facing. Thus, the CRM design must be modified to address coverage concerns.

To conclude, the phenomenal growth in CRM activities nationwide and the large public investment into them now requires the thorough evaluation of its impact and performance. This study, which looks into the case of Panguil Bay, serves as a starting point particularly in ascertaining the long-term impact of CRM. Its major limitation is its use of household perceptions instead of actual data as basis for analysis. This choice was made precisely because of the lack of reliable existing time-series data that can be utilized to assess the long-term performance of CRM. It is strongly suggested that future CRM activities include serious efforts to refine impact indicators of performance, develop the variables for their measurement, and then monitor and record changes in these variables over time.

REFERENCES

Adan, E.Y. 2000. The impact of economic activities on water quality and fish production in Panguil Bay, Philippines. Ph.D. dissertation. University of the Philippines at Los Baños, College, Laguna.

Asian Development Bank. 1989. Report and recommendation of the President to the board of directors on proposed loans and technical assistance to the Republic of the Philippines for the fisheries sector program. Manila, Philippines.

De Guzman, F. 1996. Finfish Resources of Panguil Bay (Component II assessment post-resource and ecological assessment monitoring and training project in Panguil Bay). Terminal Report, Mindanao State University-Department of Agriculture Fisheries Sector Program, Naawan, Misamis Oriental.

Department of Environment and Natural Resources, Bureau of Fisheries and Aquatic Resources of the Department of Agriculture, and Department of the Interior and Local Government. 2001a. Philippine coastal management guidebook no. 4: involving communities in coastal management. Coastal Resources Management Project of the Department of Environment and Natural Resources, Cebu City, Philippines.

_____. 2001b. Philippine coastal management guidebook no. 6: managing municipal fisheries. Coastal Resources Management Project of the Department of Environment and Natural Resources, Cebu City, Philippines.

Elazegui, D., P. de Guzman and C. Foronda. 1999. Fishery resource management: policy perspective and field experiences in the Philippines. Institute of Strategic Planning and Policy Studies, College of Public Affairs, University of the Philippines at Los Baños, Laguna.

Fisheries Resource Management Project. 2002. *2001 annual report*. Bureau of Fisheries and Aquatic Resources, Department of Agriculture, Quezon City.

_____. 2001a. Project profile of coastal resource management and related initiatives in the Philippines. FRMP Information Paper No. 18. Bureau of Fisheries and Aquatic Resources, Department of Agriculture, Quezon City.

_____. 2001b. Mid-term review memorandum of understanding (MOU). FRMP Information Paper No. 60. Bureau of Fisheries and Aquatic Resources, Department of Agriculture, Quezon City.

_____. 1999. Fisheries resource management project brochure. Bureau of Fisheries and Aquatic Resources, Department of Agriculture, Quezon City.

Hancock, J. 1994. Putting fisherfolk first: nongovernment organizations and the process of community-based coastal resource management. Voluntary

Service Overseas (VSO) Philippines - Skills for Environmentally Sustainable Development Project, Philippines.

Katon, B.M., R.S. Pomeroy, M. Ring and L. Garces. 1998. Mangrove rehabilitation and coastal resource management project of Mabini-Candijay: a case study of fisheries co-management arrangements in Cogtong Bay, Philippines. Fisheries Co-Management Research Project Working Paper No. 33. International Center for Living Aquatic Resources Management, Makati City.

Katon, B. M., R.S. Pomeroy and Albert Salamanca. 1997. The Marine Conservation Project for San Salvador: a case study of fisheries co-management in the Philippines. Fisheries Co-Management Research Project. Working Paper No. 23. International Center for Living Aquatic Resources Management. Makati City.

Local Government Center. 1996. Study on the management of fisheries/aquatic resources at the local level in the Philippines. Fisheries Co-Management Research Project Research Report No. 7. International Center for Living Aquatic Resources Management, Makati City.

Mindanao State University (MSU) Naawan. 1991. Resource and ecological assessment of Panguil Bay. Terminal report, MSU Department of Agriculture Fisheries Sector Program, Naawan, Misamis Oriental.

Mindanao State University (MSU) Naawan Foundation for Science and Technology Development, Inc. 1996. Post-resource and ecological assessment monitoring and training project in Panguil Bay. Terminal report, (MSU) Department of Agriculture Fisheries Sector Program, Naawan, Misamis Oriental.

Mulekom, L. and E.C. Tria. 1999. Community-based coastal resource management in Orion: a case study on the development of a municipal-wide community-based fisheries co-management system. Fisheries Co-Management Research Project Working Paper. International Center for Living Aquatic Resources Management, Makati City.

Philippine Institute of Alternative Futures. 1998. A primer on coastal and marine resources. Published for the Philippine Council for Sustainable Development (PCSD).

Pomeroy, R.S., R.B. Pollnac, B. M. Katon and C.D. Predo. 1997. Evaluating factors contributing to the success of community-based coastal resources management: the Central Visayas Regional Project 1, Philippines. International Center for Living Aquatic Resources Management (ICALRM) and the University of Rhode Island.

Pomeroy, R. S. and M.B. Carlos. 1996. A review and evaluation of community-based coastal resources management in the Philippines, 1984-1994.

Fisheries Co-Management Research Project Research Report No. 6. International Center for Living Aquatic Resources Management, Makati City.

Pomeroy, R.S., R.B. Pollnac, C.D. Predo, and B.M. Katon. 1996. Impact evaluation of community-based coastal resource management projects in the Philippines. Fisheries Co-Management Research Project Research Report No. 3. International Center for Living Aquatic Resources Management, Makati City.

Pacific Rim Innovation and Management Exponents, Inc. (PRIMEX) and ANZDEC. 1996a. Fisheries sector development project phase I report. Volume I: Fisheries sector review and Proposed FSDP framework. Pasig City.

_____. 1996b. Fisheries sector development project phase I report. Volume I: Fisheries sector review and Proposed FSDP framework. Pasig City.